NOTES.

THE meetings for the discussion of important contributions to meteorological literature, arranged by the director of the Meteorological Office, will be resumed on Monday, November 26, at 5 p.m., with a discussion of Mr. J. Aitken's paper "On Dew."

A REUTER message from Toronto records that on November 19 electrical energy generated at Niagara Falls, eighty miles away, was delivered there for the first time. A supply of 40,000 horse-power is available.

CAPTAIN AMUNDSEN, the leader of the *Gjoa* Polar Expedition, and his companions arrived at Christiania on November 20. Among the large number of people who assembled on the landing stage to receive the explorer were the President of the Storthing, the members of the Government, and the magistracy, the President of the Municipal Council, the admirals of the station, the general in command of the capital, and the president of the Norwegian Geographical Society.

ON November 13, at 11 p.m., a sharp shock of earthquake was felt both in the south and the north of Jamaica. It was immediately followed by a second shock, the heaviest experienced in Kingston for many years. From Perth, Western Australia, it is reported that an earthquake was felt at 3.20 p.m. on November 19 along the whole of the coast from Albany to Sharks Bay. The shock was very severe at Perth, Busselton, Geraldton, and Marble Bar.

THE spermatogenesis of one of the swallow-tailed butterflies (*Papilio rutulus*) forms the subject of a long article by Dr. J. P. Munson in the Proceedings of the Boston (U.S.A.) Society of Natural History (vol. xxxiii., part iii.).

IN the *Irish Naturalist* for November Mr. R. J. Ussher gives an account of the excavation of certain "hyæna-dens" in the Mammoth Cave near Doneraile, county Cork. The discovery of the system of caves of which this forms a part is recorded in the Proceedings of the Royal Irish Academy for November, 1904. Seventy-six baskets of bones and teeth were obtained from the Mammoth Cave and dispatched to the Dublin Museum. All the remains identified appear referable to the ordinary cavern species; but the remains of the cave hyæna are the first record of the occurrence of that species in Ireland.

Two articles are included in vol. lxxxiv., part iv., of the *Zeitschrift für wissenschaftliche Zoologie*, one by Mr. F. Hempelmann on the morphology of two marine annelids of the genus Polygordius, and the second by Dr. E. Zander on the filtering apparatus of the gills of teleostean fishes. In 1903 the latter author discovered a certain appendage to the gill-filters of fresh-water fishes, and the present paper is based on a fuller study of this structure, more especially in marine species, of which a large number has been examined. It has been found that the development, and in some degree also the function, of the filtering apparatus vary considerably according to the mode of life, bottom-dwelling species using it to aid in the supply of nutriment.

AN interesting article on entomological photography appears in *Focus* of November 21. The object of the article is to show how photographs of many kinds of insects may be taken in all stages of their existence from living specimens in captivity, and in some instances amid imitations of their natural surroundings. When aquatic insects form the subject of the experiment, a narrow and deep tank is, of course, essential. When dealing with butterflies, it is found most advantageous to take them just after leaving the chrysalis, or, failing this, they may be made quiescent by the application of a small quantity of chloroform. The photograph of a group of five "tortoiseshells" appears very successful. In the case of night-flying moths, it is impossible to display the full characters of the species from living specimens when at rest, while to depict them flying is likewise an impossibility. To overcome these difficulties the photographer has resorted to the plan of first photographing mounted specimens in the positions desired, and then combining the photograph thus obtained with one of a suitable background. If a suitable landscape-negative has been previously taken, by placing this behind the focusing screen the moths can be arranged in such a position that they will appear exactly in the right place in the compound picture.

IN the course of a paper on the papillary ridges and papillary layer of the skin of the hand and foot of mammals other than man, published in vol. xli., part i., of the *Journal of Anatomy and Physiology*, Dr. Walter Kidd points out that these structures attain their maximum development in the lemurs and their relatives. "These characters suggest very clearly that in this group of animals the sense of touch is extremely important. . . . If one bears in mind that three [groups] of them are nocturnal and arboreal and the other two diurnal and arboreal, one can gather from these facts the great importance to them that their sense of touch should be very acute. A continual need of their arboreal lives is that they should maintain by reflex means their equilibrium, and I would suggest that in their highly developed papillary ridges and papillary layer of the corium they possess most efficient structures for the transmission of impulses to their nerve-centres for the performance of this important function." To the same issue Mr. E. J. Evatt contributes a paper on the development of these structures. The other articles are mainly devoted to the description of various monstrosities and other abnormalities.

IN the Proceedings of the American Academy for October there is an interesting study of inheritance in fishes, by Mr. A. P. Larrabee. In the majority of the teleosts, the fibres of the two optic nerves do not interlace at the chiasma, but remain distinct, and it has been shown for certain species that specimens in which the nerve running to the right eye is dorsal, and specimens in which the reverse is the case, are almost equally frequent. The present investigation, commenced by Dr. W. E. Castle and completed by Mr. Larrabee under his direction, was undertaken with the view of determining whether this character is heritable, and if so in what manner. Crossings were made with the brook trout and with the cod, and the rather remarkable conclusion is reached that the character is not inherited at all. Of 971 trout, for instance, in both the parents of which the right nerve was dorsal, 52 per cent. had the right nerve dorsal, while of 1519 with unlike parents, 56 per cent. had the right nerve dorsal. The character does not appear to be affected by gravity; the dimorphism is not due to an earlier development of one of the optic nerves, and in monstrous two-headed specimens of the trout the two heads differ in structure as often as not; practically speaking, it seems to be a matter of chance which nerve is dorsal. There is however, a curiously persistent preponderance of cases with the right nerve dorsal, and Dr. Castle, in a footnote, directs attention to the apparent similarity of the phenomenon with the more frequent occurrence of polydactylism in guinea-pigs on the left side of the body.

IN the first part of vol. xxxvi. of Gegenbaur's *Morphologisches Jahrbuch* Prof. Schmaltz, of Berlin, furnishes further information with regard to the assertion (mentioned some months ago in these columns) that a pleural cavity is lacking in the Indian elephant. The author's observations are based on dissections of four elephants, one from the Berlin Zoological Gardens and three from a circus. In each instance the structure of the pleural viscera was of the same type. The heart was normal. The lungs possessed a dense fibrous capsule, but between their outer surface and the wall of the thorax occurred a homogeneous mass of connective tissue, completely filling the cavity of the chest. The connective tissue presented no signs of being a pathological product, and, in the author's opinion, it must consequently be accepted as a fact that a pleural cavity is absent in the Indian elephant. In a second article Mr. A. Rauber records and figures two instances of the occurrence of an "intermetatarsal bone" in the foot of the human subject. The bone in question is an ossicle wedged in between the entocuneiform of the tarsus and the bases of the first and second metatarsals. The number of recorded cases of a similar abnormality is now brought up to eighty-eight, and the author concludes by discussing the bearing of this feature on the theory of a lost digit. The contents of the same issue also include an article, by Dr. C. Gruber, on the structure and development of the reproductive organs of the guinea-pig; a second, by Dr. W. Braun, on the development of the pancreas in the midwife-toad; and a third, by Mr. Max Borchert, on the central nervous system of the torpedo.

THE *Philippine Journal of Science* for September (i., No. 7) contains a long paper on beri-beri by Mr. M. Herzog, who believes that this disease is an infective one, the organism of which has yet to be discovered; notes on Philippine and other birds, by Mr. R. C. McGregor; and a description of a new genus and species of Culicidæ, by Mr. C. S. Banks. This mosquito (*Worcesteria grata*) does not bite, and its larvæ destroy numbers of noxious forms of Culicidæ. The genus is near the genera Megarhinus and Toxorhynchites. The number is well illustrated with many plates, and is a most creditable production.

IN the Bulletin of the Johns Hopkins Hospital for November (xvii., No. 188) Dr. C. W. Eliot discusses the future of the medical profession, and concludes that in the course of time it will have the satisfaction, not only of ameliorating the condition or prolonging the life of the suffering individual, but also of exterminating or closely limiting preventable diseases. Notes on the International Congress of Tuberculosis, Paris, 1905, are contributed by Dr. H. B. Jacobs, and on the advantages of local sanatoria in the treatment of consumption by Dr. D. R. Lyman. Governor John Winthrop, jun., of Connecticut, a physician of the seventeenth century, is the subject of a paper by Dr. W. R. Steiner, and Prof. Welch's address on the unity of the medical sciences, delivered at die dedication of the new buildings of the Harvard Medical School, is published in full.

THE issue of selected papers on rubber from the *Kew Bulletin* as No. 7 of the additional series is opportune at the time when this product is receiving so much attention. Not only do the papers furnish a historical account of the gradual accumulation of knowledge that is bearing fruit at the present day, but old facts served up as new, such as the artificial production of rubber, are here placed in proper perspective. The most recent papers are the synopses of the genera Kickxia and Funtumia, by Dr. O. Stapf, published in the *Kew Bulletin*, 1905, and a note on the rise and fall in prices of Para rubber contributed by Mr. J. H. Hillier to the part lately issued.

A CATALOGUE of botanical slides issued by Mr. A. Peniston, Montpelier Terrace, Leeds, can be recommended to the notice of those desiring microscopical slides of practical educational value, illustrating the chief features in the taxonomy and anatomy of plants. Of the slides examined, the root apices showing mitoses and the transverse section of Equisetum root were especially good, and all were satisfactory. Messrs. Clarke and Page, of London, supply botanical and geological preparations, but make a greater speciality of marine slides, which, judging from specimens seen, will be found suitably and well prepared.

THE annual report for 1905 of the Royal Botanic Gardens, Ceylon, contains eight reports by assistants, in addition to the general report by the director, Dr. J. C. Willis. The branch gardens at Badulla and Anuradhapura were closed in favour of a botanic garden at Mahailuppalama, where an experiment station has already been established. Rubber has, of course, monopolised most attention, but the production of the oils of cocoa-nut, citronella, and cinnamon shows a considerable increase, and in the market for coca leaves Ceylon provides the standard. The curator of the Peradeniya gardens records the failure of the attempt to propagate Hevea by cuttings; as a substitute for boxwood edgings in tropical gardens he recommends cuttings of *Malpighia coccifera.*

THERE are several facts and observations, interesting to botanists, on the subject of xerophytes and plant transpiration in the publication No. 50 of the Carnegie Institute of Washington entitled "The Relation of Desert Plants to Soil Moisture and to Evaporation," representing investigations by Dr. B. E. Livingston at Tucson, in Arizona. With regard to the soil, it was found that the deeper layers contained an adequate supply of water even at the end of the dry season, this being due partly to the formation of a dust mulch. Cacti showed no greater osmotic pressure in the cell-sap than plants in humid regions. An ingenious evaporimeter, consisting of a porous clay cylinder attached to a burette and water receiver, was devised for comparing evaporation with transpiration. The author expresses the opinion that air temperature, and not light, is the main controlling factor in the rate of transpiration.

PROF. POTONIÉ, of Berlin, contributed a paper (an abstract of which has now reached us) to Section K at the York meeting of the British Association, in which he pointed out the strict parallelism that exists between the different kinds of peat and the different kinds of coal (which is simply fossil peat). When conditions are such that organic remains collect under terrestrial conditions we have ordinary peat formed. This corresponds exactly with "bright" coal. When, on the other hand, organic remains collect under water, the result is an organic slime which the author calls "sapropel," becoming of a gelatinous consistency ("saprokoll") when subfossilised. This, according to Prof. Potonié, is exactly equivalent to the "dull coal" or "cannel coal" of Carboniferous age. When terrestrial and aquatic conditions have alternated during the accumulation of organic remains, we obtain "strata-peat" or "strata-coal," *i.e.* interbedded saprokoll and peat, or "bright" and "dull" coal. The chemical and physical properties of these varieties correspond very closely, the cannel coal being gas coal and saprokoll containing much more gas than genuine peat. The author regretted that living peat bogs were so extensively killed by drainage, and pointed out that we were thus destroying a possible source of fuel supplies when our coal should be exhausted.

THE Channel tunnel project forms the subject of an article in the *Engineer* (vol. cii., No. 2654). Particulars are given of what has been accomplished, from an engineering and scientific point of view, upon the other side of the Channel towards the solution of the great international problem.

AT the Institution of Civil Engineers on November 13 a paper was read on single-phase electric traction, by Mr. C. F. Jenkin. A paper on electric traction on railways, by Messrs. Mordey and Jenkin, was read before the institution in 1902. The object of the present paper was first to bring the previous account of the different systems up to date, and to show how far the conclusions then arrived at have to be modified in the light of recent experience, and then to describe the equipment required for single-phase working and to discuss the different problems which arise in connection with it. Little advance has been made in continuous-current working. The voltages have risen a little, and in a few cases pressures of 1000 and 3000 volts are in use. The principal advances in three-phase working have been the completion of the Zossen experiments, the opening of the Valtellina line, and the adoption of three-phase working for the Simplon Tunnel. Experience has confirmed Messrs. Mordey and Jenkin's conclusion that the single-phase is the only system which can satisfy all the requirements of a general system.

ACCORDING to the official statistics published in the Mines and Quarries General Report (part iii., 1906) the output of coal in Great Britain in 1905 was the highest hitherto recorded, being as much as 236,128,936 tons. Of this total, 47,476,707 tons were exported, and 19,255,555 tons were used in the manufacture of pig-iron. The home consumption was 3·91 tons per head of population. Statistics relating to the manufacture of coke and briquettes were collected for the first time, the production of coke in 1905 having been 18,037,985 tons, and that of briquettes 1,219,586 tons. There were 31,060 coke ovens in operation. Of these, 25,514 were of the beehive type; and there were 2233 Coppée ovens, 726 Simon-Carvés ovens, 503 Otto-Hilgenstock ovens, 470 Semet-Solvay ovens, 72 Koppers ovens, 52 Bauer ovens, and 1490 other kinds. The production of iron ore was 14,590,703 tons, which yielded nearly one-half of the total quantity of pig-iron (9,608,086 tons) made in the country. Copper, lead, silver, and tin show an increase on the figures of 1904, both in the amount and in the value of the metal obtained.

A SIMPLIFIED method of transforming readings of the Fahrenheit thermometer into centigrade values and *vice versâ* is given by Dr. Hellmann in No. 38 of the *Naturwissenschaftliche Rundschau*. The ordinary formulæ, for example $C=5/9\,(F-32)$, are not adapted for rapid calculation. The modified formulæ

$$C=(\tfrac{1}{2}-\tfrac{1}{2}\cdot\tfrac{1}{10}-\tfrac{1}{2}\cdot\tfrac{1}{100})(F-32), \text{ and } F=(2-\tfrac{2}{10})C+32,$$

on the other hand, containing decimal fractions, lend themselves much more readily to the purpose. To transform, for example, 110° F., we have $110-32=78$, and the centigrade value becomes $39+3{\cdot}9+0{\cdot}4=43^\circ{\cdot}3$.

A REVISION of the atomic weight of bromine made by Mr. Gregory P. Baxter in the chemical laboratory of Harvard College is published in the Proceedings of the American Academy of Arts and Sciences (vol. xlii., No. 11). Considerable uncertainty exists as to the purity of the materials employed in several of the earlier determinations, owing principally to the fact that while it is easy to eliminate metallic impurities from silver, it is not so easy to ensure the absence of occluded gas. Two different methods were adopted in the determinations: in one, highly purified silver was converted into silver bromide; in the other, the ratio of silver bromide to silver chloride was determined by acting on the former with purified chlorine. As many different methods of purification as possible were employed for the materials used. Eighteen determinations by the first method gave a value of the atomic weight varying from 79·950 to 79·955, silver being taken as 107·930; thirteen determinations by the second method ranged from 79·951 to 79·955. The average of both series was 79·953.

A VOLUME of essays, or rather lectures, by the late Lieut.-General A. Lane-Fox Pitt-Rivers, edited by Mr. J. L. Myres, will be issued immediately by the Oxford University Press. Mr. Henry Balfour, the curator of the Pitt-Rivers Museum, has written an introduction to the volume, which is entitled "The Evolution of Culture."

THE eleventh volume of the complete works of Christiaan Huygens, which are being published from time to time by the Société Hollandaise des Sciences, is in course of preparation, and will, it is expected, be ready in about a year. The tenth volume of the works was reviewed in our issue for August 17, 1905 (vol. lxxii., p. 362). Meanwhile, an extract from the eleventh volume has been issued separately under the title "Travaux divers de Jeunesse, 1645–1646"; it is edited by M. D. J. Korteweg, and published by M. Nijhoff, of the Hague. Several papers written by Huygens in 1645 and 1646—that is to say, in his seventeenth and eighteenth years—are included in this preliminary publication.

MESSRS. WILLIAMS AND NORGATE have sent us a prospectus of "The Paintings of Antiquity," edited by Herr Paul Herrmann, and published by Herr F. Bruckmann, of Munich. The work is to be published in sixty parts, and will contain about 600 plates, of which twelve to fifteen will be coloured. Six parts will be published annually. The nucleus of the collection of pictures is formed by reproductions of wall paintings removed from their original positions in houses at Pompeii, Herculaneum, and Stabiæ, and taken to the Museo Nazionale at Naples. A limited selection of mosaics will be included. Whatever paintings have been preserved of the ancient Greek and pre-Hellenic periods will be comprised in the collection; and the work will also include the most important of the mummy portraits from the Fajûm.

OUR ASTRONOMICAL COLUMN.

ANOTHER NEW COMET (1906*h*).—A telegram from the Kiel Centralstelle announces the discovery of a comet on November 14 by Mr. Joel Metcalf, of Taunton (Mass.). Its position on that date at 10h. 0·4m. (Taunton M.T.) was R.A. = 4h. 4·6m., dec. = 2° 16′ S., and the apparent direction of its motion is given as south-west. This position is about half-way between 35 and ξ Eridani, and crosses our meridian shortly after midnight. The comet's magnitude is given as 12·0.

A second telegram states that this object was observed by Mr. Hammond at Washington on November 16, its position at 11h. 38m. (Washington M.T.) being

R.A. = 4h. 4m. 11·4s., dec. = 2° 46′ 55″ S.,

and its magnitude 11·0.

COMET 1906*g*.—From observations made on November 10, 11, and 12, Herr M. Ebell has calculated a set of elements and an ephemeris for comet 1906*g*, the discovery of which was announced in these columns last week. The elements show that this comet passed through perihelion on November 7.